A historical review of the key technologies for enterprise brand impact assessment

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Abstract. Relying on complex network technology, natural language processing technology, value evaluation and distributed computing technology and other related technologies, large enterprises to evaluate their own brand influence, which can enhance brand value for the enterprise, expand the brand international influence, optimize the environment of enterprise development, to provide effective tools, to provide important support for shaping a good corporate image.

Keywords: Brand value; brand influence; evaluation.

1 Introduction

Relying on complex network technology, natural language processing technology, value evaluation and distributed computing technology and other related technologies, large enterprises to evaluate their own brand influence, which can enhance brand value for the enterprise, expand the brand international influence, optimize the environment of enterprise development, to provide effective tools, to provide important support for shaping a good corporate image.

2 Complex network technology

Complex network research due to the characteristics of its interdisciplinary and complexity, involves the subject knowledge and theoretical basis, especially system science, statistical physics, mathematics, computer and information science, etc., commonly used analysis methods and tools including graph theory, combinatorial mathematics, matrix theory, probability theory, stochastic process, optimization theory and genetic algorithm, etc. In recent years, many concepts and methods of statistical physics have also been successfully used to model and compute complex networks, such as statistical mechanics, self-organization theory, critical and phase transition theory, percolation theory, etc., such as the concept of network structure entropy, and they are used to quantitatively measure the "order" of complex networks. Complex network models have been widely used in many scientific fields[1].

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The structure of the network is closely related to function, the topology structure determines function, and function affects the topology structure evolution. In order to study the topological structure characteristics of complex networks, Erdos and Renyi first constructed a stochastic network model (ER model) according to the random graph theory, but the connection rules of ER model and the randomness of node distribution make it unsuitable for the study of real complex networks[2]. Therefore, based on the defects of the existing network models and the needs of real network research, scholars have proposed a large number of different complex network models.

2.1 Small-world network model

It is generally considered that the network has a small world effect if its average path length L is proportional in logarithm to the logarithm of the number of nodes N. The vast majority of real complex networks have small-world effects, that is, a small average path length and a large agglomeration coefficient.

2.2 Scale-free network model

In the random and small world networks, nodes have approximately a Poisson distribution. However, the researchers found that the degree distribution of most real complex networks follows a power law distribution, that is, as the node degree k increases, the distribution function P (k) decay speed becomes smaller.

2.3 Local area world network model

The preferential connection mechanism in BA model exists in the global network. However, Li et al. through the study of real complex networks found that the preferential connection mechanism only exists in the local network, so a simple local world network model (LC model) is proposed on the basis of BA model. The model first randomly selects m nodes as the local world of the new nodes. The new nodes will preferentially connect the nodes with large moderate values in the corresponding local world, rather than select the nodes with large moderate values in the global network to connection[3].

2.4 Weight network model

All of the above network models regard the network as an unauthorized network, ignoring the information such as the degree of interaction between nodes or the physical quantity of nodes and edges. The real network is often a weighted network with weights of nodes or edges. Compared with the unauthorized network, the weighted network can better reflect the real situation.

3 Natural language processing techniques

Natural language processing generally began in the 1950s. 1950, Turing published his paper "Computers and Intelligence", Propose the now-called "Turing test" as a condition for judging intelligence; The Georgetown-IBM experiment in 1954 involved the automatic translation of more than 60 sentences of Russian into English; The particularly successful NLP systems of the 1960s included SHRDLU——, a natural language system such as the "building blocks world", And ELIZA ——, designed by Joseph Visenbaum to simulate "personal center therapy" from 1964-1966, with little use of human thought and emotion; In the 1970's, The programmer began the design of the Concept Ontology (conceptual ontologies) program, Will be the real-world message, The frame forms the information that the computer can understand. Examples include MARGIE, SAM, PAM, TaleSpin, QUALM, Politics[4], and Plot Unit. Many chatbots were written during this period, including PARRY, Racter, and Jabberwacky; until the 1980s, most NLP was based on a complex, artificial set of rules. But from the late 1980s, language processing introduced machine learning algorithms, and NLP innovated.

From 2008 to now, in the achievements of the field of image recognition and speech recognition, people began to introduce deep learning to do natural language processing research, by the original word vector to word2vec in 2013, the combination of deep learning and natural language processing to a climax, and in machine translation, quiz system, reading comprehension and other fields has achieved certain success. Deep learning is a multi-layer neural network, with output layer by layer from the input layer. Do end-to-end training from input to output. Prepare the data input to the output pair, design and train a neural network to perform the expected task. RNN has been one of the most commonly used methods of natural language processing, and GRU, LSTM and other models have triggered one round after another upsurge.

Recently, pre-trained language models have made important progress in the field of natural language processing. Since ELMo, GPT, BERT and a series of pre-training language representation model (pre-trained Language Representation Model), pre-training model on the vast majority of natural language processing task showed far more than the traditional model, received more and more attention, is one of the biggest breakthrough in the field of NLP in recent years, is the most important progress in the field of natural language processing[5].

BERT (Bidirectional Encoder Representation f [] rom Transf [] ormer) is a pre-trained language model proposed by Google AI in NAACL2019. The innovation point of BERT is to propose effective unsupervised pre-training tasks, so that the model can acquire the common language modeling ability from the unannotated corpus. After BERT, many models have been expanded (as shown in the figure above), including: cross-language pre-trained XLM and UDif [] y, cross-modal pre-trained model, ERNIE integrating knowledge graph, seq2seq and other language generation tasks integrated into BERT class model MASS, UniLM, etc.

In recent years, NLP has been very avant-garde, attracting people to research it and increasingly applying it in various industries. The popularization of Internet technology and the urgent demand of NLP technology by the trend of world economic and social

integration have provided a strong market power for NLP research and development. NLP research results in service applications, but also promote the development of emerging disciplines, such as bioinformatics. In addition, the understanding of NLP is changing the architecture of computers, and the improvement of NLP capability will be an important goal of the next generation of computers[6].

NLP existing problems mainly has two aspects: on the one hand, so far the grammar is limited to analysis of an isolated sentence, context and conversation environment constraints and influence of this sentence also lack of systematic research, so analysis of ambiguity, words, pronoun, the same sentence in different occasions or by different people have different meanings, there is no clear rules to follow, need to strengthen the study of semantics and pragmatics to gradually solve. On the other hand, people understand a sentence not only by grammar, but also use a lot of relevant knowledge, including life knowledge and expertise, these knowledge can not be stored in the computer. So a written understanding system can only be built within a limited range of words, sentence patterns, and specific topics; computer storage and speed. In order to realize the natural language communication between man and machine, it is necessary to solve the wide variety of ambiguity or polysemy at all levels of NLP text and dialogue. If this problem is solved, the effective communication between man and machine will be greatly improved.

NLP is widely used, from the underlying word segmentation, language model, syntactic analysis, speech annotation, speech recognition and other high-level semantic understanding, pragmatic interpretation, dialogue management, knowledge questions and other aspects, almost all have deep learning models, and has achieved good results. Related research has been transformed from traditional machine learning algorithms to more expressive deep learning models, such as convolutional neural networks and regression neural networks. However, current deep learning techniques do not have the necessary conceptual abstraction and logical reasoning capabilities necessary to understand and use natural language, pending further research in the future.

4 Financial media data collection and analysis technology

4.1 Distributed file system based on HDFS

In recent years, with the further development of science and technology, the amount of global data has seen rapid growth, especially the emergence of more attention to user interaction, which has changed the role that users can only be Internet readers in the past, and users have become the creators of Internet content. In such a massive information environment, the traditional storage system has been unable to meet the requirements of the rapid growth of information, there are bottlenecks in the capacity and performance requirements, such as the number of hard disks, the number of servers and so on.

HDFS (Hadoop Distributed File System) is different from the traditional distributed parallel file system, running on cheap machines, with high throughput, high fault tolerance, high reliability of the new distributed file system. Has data distribution storage

and management functions, and provides high-performance data access and interaction[7].

HDFS is a distributed parallel file system under the Hadoop framework. In addition to the universal parallel file system characteristics, it also has its own unique design ideas. Hadoop Nutch, an open source project from Apache, became an independent open source project in 2006, mainly used to store and manage the massive data of large files in GB. It adopts simplified design concept, more simplified batch processing method and corresponding copy management strategy to realize the system with the ability to process massive data.

In the distributed parallel file system, the copy is an important part of it, and the copy technology is to coordinate the resources of each node in the Internet to complete an efficient and heavy task. The way to achieve this task is to improve the effective transmission of data between the nodes through copy placement, copy selection, copy adjustment and other ways.

4.2 Spark parallel computing framework

The advent of the era of big data has promoted the rapid development of cloud computing and big data technology. The gradual birth of HDFS, MapReduce and HBase marks the gradual formation of an ecosystem based on Hadoop. However, with the rapid growth of data volume and the increasing user demand, people's requirements for data processing efficiency are becoming higher and higher. Under this background, the Spark computing framework based on memory computing emerges at the historic moment and has quickly become the focus of people's attention.

Spark Is Berkeley AMP lab based on MapReduce open source project, gradually become the most popular general parallel framework, has the advantages of Hadoop distributed system, and further optimization, in the process of computing is based on memory, do not need to like Hadoop map after the intermediate results in disk, reduce stage from disk reading, greatly accelerated the operation process, especially suitable for repeated iterative calculation. Spark The memory distributed dataset, namely RDD, not only enables interactive query, but also optimizes the iterative process. Spark Based on the Scala implementation, especially the implementation of the kernel, it makes full use of the characteristics of the Scala language, and provides many API interfaces to support multiple languages, such as Scala, Java, Python, etc. At the same time, Spark framework provides a large number of application libraries for different application scenarios. The development of Spark ecosystem is increasingly mature, such as Spark SQL, Graphx, ML, Spark Streaming, etc., all have their own applicable situations, and can be integrated together to complete relevant tasks. In the storage layer, Spark also supports HDFS, Hbase, S3 and so on. Spark The RDD provided is a collection of data elements, which can be divided into different clusters to perform the data in parallel. In case of failure, it can be automatically recovered by RDDS.

4.3 Financial media monitoring

The primary task of the supervision and management of the financial media data is to monitor the public opinion. Public opinion refers to the social and political attitude held by the public in the process of the occurrence, development and change of events. It mainly includes four aspects: 1) it is the reflection of the public opinion collection; 2) the public opinion is the "public opinion" that affects the decision-making behavior of the ruler; 3) it is the event, so the public opinion should first have a detailed and in-depth understanding of the event; 4) space plays an important role in the dissemination of public opinion and its influence on the decision-making behavior of the ruler. Therefore, it is very necessary for the state to monitor and control the financial media data.

Due to the inherent openness and virtuality in the era of financial media, the data of financial media has the following characteristics: 1) Freedom and openness. Due to the concealment of the Internet, more and more people are willing to express their true feelings and views on the Internet, and they can easily express them through social platforms such as BBS and Weibo. 2) Interaction. When expressing opinions on a certain issue or event, it is easy to form a situation of mutual debate and discussion, thus forming different camps. 3) The sudden nature. The public opinion on the network is often formed by the discussion of a current event and some emotional opinions, which often has a greater impact in a very short time. 4) Deviation. Due to the influence of subjective and objective aspects, the speech of netizens has certain limitations, relatively emotional and emotional, especially some people take it as a place to vent their emotions.

Financial media data acquisition and topic analysis technology can help users to automatically collect data from the Internet, detect hot topics, and deeply mine the topics. So as to find the relationship between various factors in the event, to understand all the details of an event on the whole, which is of great significance to the network public opinion information monitoring, information security.

5 Conclusion

Relying on complex network technology, natural language processing technology, value evaluation and distributed computing technology and other related technologies, large enterprises to evaluate their own brand influence, which can enhance brand value for the enterprise, expand the brand international influence, optimize the environment of enterprise development, to provide effective tools, to provide important support for shaping a good corporate image.

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